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June 5, 1984

Special Edition

Greenbelt, Maryland

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## IUE VISITS THE ANTISUN

On January 11, IUE was scheduled to perform a "delta-V", that is an orbital correction maneuver. During such a maneuver, the large hydrazine jets are fired to counter the westward drift of IUE's orbit. The "burn" went off on schedule, but then things went wrong as IUE went into a spin. The spacecraft engineers initiated the "sunbath" control mode, an emergency control system using the reaction wheels. At first the spacecraft was spinning too fast for the wheels to control. IUE ended up in a three-axis spin around the antisun. The engineers were eventually able to unload the extra momentum on the reaction wheels so that the sunbath mode was able to capture and control the satellite. Then the on-board computer was reloaded with the normal control mode software. Finally the Resident Astronomers took over to try to figure out where in the sky IUE had ended up! The entire recovery process took 12 hours.

The follow-up analysis to this event indicated that the original problem was due to an on-board computer crash during the critical delta-V burn. A secondary problem was caused by a previously existing (but undetected) imbalance between the two large jets fired during the orbital correction maneuver. The combination of the crash and the jet imbalance caused the spacecraft to slew out of control very quickly.

Because of the aborted delta-V, IUE's orbit continued to drift westward. If the drift were allowed to continue, the satellite would start to drift out of view of the Goddard tracking antennas for an increasing period of time every day starting in April. To avoid this another delta-V was performed on February 14. Special precautions were taken to insure that the hydrazine jets were cool, since heat causes bubbles in the gas that may have contributed to the jet imbalance. This orbital correction was successful (happy Valentine's day!).

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## PRESENTING THE NEW LWR ITF

Last October the Three Agencies resolved to obtain the observations required to create a new ITF, the most fundamental calibration, for the LWR camera. This action was taken in part due to long-known nonlinearities in the current ITF and in part due to concerns arising from the appearance of the flare in the LWR UVC (see below).

Observations Four continuous days of observations, required to create the ITF, were performed over the long Thanksgiving weekend, November 24-27, 1983. A total of 146 images were obtained, of which 119 were used directly in the derivation of the ITF. A great deal of care was taken to obtain the best quality data possible, including maintaining the thermal stability of the scientific instrument over the entire four days.

Creation Several images per level were obtained in order to improve the signal-to-noise properties of the ITF. For all levels, at least four and often five images were used. The ITF calibration was created on the Sigma 9 computer on April 3, 1984.

Analysis Preliminary analyses indicate that the new LWR ITF provides a significant improvement in linearity and noise characteristics over the current ITF. Further analysis is in progress and will be completed before the new ITF can be implemented in the standard image processing. We plan to present detailed reports on the new ITF in this and upcoming IUE Newsletters (see article by Oliverson in this newsletter).

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#### UPDATE ON THE LWR CAMERA FLARE

The IUE Observatory staff on both sides of the Atlantic have continued to monitor the brightness of the flare in the LWR camera. The flare appeared sometime in April 1983 (see report in last Newsletter). Its brightness has continued to increase with time, although the rate at which it has developed seemed to fall off a bit last fall when we switched to the LWP camera.

Flare Brightness The flare is now bright enough that it can be detected easily in exposures of 30 minutes or less. In long exposures of several hours, the flare is saturated and appears to affect a large region in the lower third of the image. At this time, high dispersion LWR observations of long duration are not recommended due to the contamination of the image by the flare. It is expected that, by this fall, even low dispersion images obtained with long integrations could be contaminated by the flare.

GO Use of the LWR The status of the LWR camera was debated at the recent Three Agency Meeting held on May 9-11. VILPSA and GSFC agreed to continue to allow the use of the LWR camera for Guest Observer programs. However, observers must seek approval from the IUE Project and show scientific justification for using the LWR rather than the LWP camera. Use of the camera is to be kept under a maximum rate of 200 hours exposure time per year (approximately its current usage level). It is hoped that a reduction in the use of the camera will limit the rate that the flare is brightening. A letter regarding the LWR camera usage policy has recently been sent to the US Guest Observers by the IUE Project.

Future of the LWR The UK camera engineers have suggested operating the camera at a lower Ultraviolet Converter voltage (UVC) in order to avoid the effects of the flare. VILPSA and GSFC are performing tests to study the behavior of the camera in this configuration. Preliminary analysis indicates that the LWR will be less sensitive; exposure times would be about 1.36 times longer than at present. It is expected that we may be forced to switch to the lower UVC voltage configuration sometime this fall. The LWP will continue to be our default long-wavelength camera, with the LWR serving as a backup camera.

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#### REMOTE OBSERVING WITH (AND FROM) IUE

Interest in observing without leaving one's home institution is on the increase. Many Guest Observers may be familiar with Don York's remote observing experiment at Chicago. The IUE Project recently conducted a survey of interest in remote observing with IUE. The results of that survey are discussed in the Users' Committee report by Lee Anne Willson in this Newsletter.

Last November the situation was reversed. Mark Giampapa came to Goddard to observe flare stars with IUE while also remote observing at Kitt Peak! Another first was the coordinated observations of SU UMA with three satellites - IUE, EXOSAT, and IRAS - by Paula Szkody and her collaborators last September.

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#### IUE EXPERIENCES TWO GYRO FAILURES

In December our Project Operations Director Ivan Mason shocked the participants at a GSFC meeting by informing them that IUE had experienced two gyro failures. Fortunately both failures were mechanical failures in a single gyro, Gyro #1, which had long ago failed due to electronics problems. The primary impact of the failures was a change in the heat balance in the whole gyro package, which affects the accuracy of IUE's maneuvers. A new scaling has since been done for the gyros, so that current maneuver accuracy is relatively good.

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#### ESA'S IUE SPECTRAL ATLAS

Our European Space Agency colleagues have published an IUE Low-Dispersion Spectra Reference Atlas. Goddard has distributed a number of copies to institutions around the U.S. A very few copies remain available for institutional distribution on a first-come, first-served basis. Additional copies for personal or institutional use are available directly from ESA.

Last fall NASA published the IUE Ultraviolet Spectral Atlas, as the NASA IUE Newsletter No. 22. This atlas is still available on magnetic tape, microfiche, and a limited number of printed copies.

## A NEW MAILING ADDRESS FOR IUE

Due to a recent reorganization of our branch at GSFC, our mail code has been changed. Please address any communications to the Project Scientist Dr. Kondo or to the Operations Scientist Dr. Kalinowski at Code 684. For all other mailings, please use:

IUE Observatory  
Code 684.9  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

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## IUE PERSONNEL CHANGES

Our new Telescope Operator Muriel Taylor, from the University of Maryland, has begun her training. She replaces Sid Broude, who has left the IUE Observatory.

Tom Ake, who has been overseeing the IUE Operations and RDAF groups, will be moving up to the Space Telescope Science Institute this fall. Cathy Imhoff will be taking over his duties.

Ivan Mason, our Project Operations Director (who has watched over IUE since before launch), will be leaving to work on the Space Telescope Project for NASA. Fred Gordon will be stepping into that job.

It must be spring. Ron and Pat Pitts are the proud parents of Marie, their second child. Rick and Robin Wasatonic are new parents as well; David is their second boy. David and Ruth (Ehlers) Bradley have just had their first child, Elizabeth Ann.

We are interested in hiring another IUE Resident Astronomer and possibly another Telescope Operator. If you or someone you know is interested in a challenging job with crazy hours, please call Tom Ake (301-344-7445).

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## WEATHER FORECAST

Expected variable conditions due to recent sporadic solar activity. Guest Observers are advised to bring umbrellas for the Maryland weather, sweaters for the chilly observing room, and targets for both high and low radiation conditions.

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